International Atomic Energy Agency Technical Committee Meeting
"Innovative Approaches to Fusion Energy"

Pleasanton, California, USA, October 20-23, 1997
Jointly Organized by the International Atomic Energy Agency and Lawrence Livermore National Laboratory

Programme Committee: L.J. Perkins (LLNL), D.D. Ryutov (LLNL) - Co-Chairmen; R. Blanken (US DoE), T.J. Dolan (IAEA), J. Herrera (Mexico City, Mexico), P. Kaw (Bhat, Gandhinagar, India), G. Kessler (Karlsruhe, Germany), V. Koidan (Novosibirsk, Russia), H. Momota (Nagoya, Japan), L.-J. Qiu (Hefei, China)

Programme

Sunday, October 19

16.00-19.00 Registration - First Floor, Livermore Rooms

18.00-20.00 Reception (no-host bar) - First Floor, Livermore Rooms

Monday, October 20

7.30-8.30 Registration - Second Floor Foyer (by Dublin Room)

8.30-10.15 Opening Session. Chairman: K. Thomassen (Livermore, USA) - Second Floor, Dublin/Pleasanton Rooms

8.30-8.45	T. Dolan (IAEA)	Opening Remarks
8.45-9.30	R. Schock (Livermore, USA)	Energy, Global Sustainability, and National Security (Invited Talk)
9.30-10.15	R. Goldston (Princeton, USA)	Implications of Recent Tokamak Research for Other Approaches to Toroidal Confinement (Invited Talk)

10.15-10.50 Coffee Break.

10.50-12.30 High-Beta Pulsed. Chairman: L. Qiu, Hefei, China - Second Floor, Dublin/Pleasanton Rooms

10.50-11.15	V. Mokhov (Arzamas, Russia)	Studying the Feasibility of Thermonuclear Magnetized Plasma Generation in Magnetic Implosion System Mago
11.15-11.40	K. Schoenberg (Los Alamos, USA)	Affordable Development of Fusion Using Magnetized Target Fusion
11.40-12.05	V. Koidan (Novosibirsk, Russia)	Fast Heating of a Dense Plasma and Prospects of Beta≥1 Experiments at the GOL-3-II Facility
12.05-12.30	F. Thio (Auckland, N. Zealand)	An Embodiment of the Magnetized Target Fusion Concept in a Spherical Geometry with Stand-Off Drivers

12.30-14.00 Lunch.

14.00-15.35 Technology 1. Chairman: M. Fujiwara (Nagoya, Japan) - Second Floor, Dublin/Pleasanton Rooms

14.00-14.45	G. Kessler (Karlsruhe, Germany)	The Future of Fission Reactors (Invited Talk)
14.45-15.10	L. Qiu (Hefei, China)	Fusion-Fission Hybrid Reactor Research Program in China
15.10-15.35	M. Ishikawa (Kyoto, Japan)	Numerical Study of Direct Energy Converters for a Deuterium-Helium FRC Fusion Reactor

15.35-16.00, Coffee break.

16.00-19.00 Poster Session 1. Pulsed Fusion Systems, ICF, Technology - Second Floor, Concord Room

Tuesday, October 21

8.30-10.30 FRC's and D-^{3}He. Chairman: G. Miley (Urbana, USA) - First Floor, Amador Rooms

8.30-9.15	H. Momota (Nagoya, Japan)	Attractive Characteristics and Issues for Developing Deuterium and Helium 3 Fusion Reactor on the Base of a Field-Reversed Configuration (Invited Talk)
9.15-9.40	A. Hoffman (Seattle, USA)	Flux Build-Up in FRCs Using Rotating Magnetic Fields
9.40-10.05	S. Goto (Osaka, Japan)	Experimental Study on Translation and Confinement-Related Phenomena of an FRC Plasma
10.05-10.30	R. Kurtmullaev (Troitsk, Russia)	Self-Organized Compact Torus as Approach to Low-Scale Fusion System with One-Step Shock Ignition

10.30-10.50 Coffee Break.

10.50-12.30 Technology 2. Chairman: G. Kessler (Karlsruhe, Germany) - First Floor, Amador Rooms

10.50-11.15	E. Kruglyakov (Novosibirsk, Russia)	Axisymmetrical Gas Dynamic Trap as a High Power 14 MeV Neutron Source. Modern Version
11.15-11.40	R. Wooley (Princeton, USA)	Synergistic Use of Liquid Lithium as Self-Protecting First Wall, Tritium Breeder, and LMMHD Electric Power Producer
11.40-12.05	V. Karas (Kharkov, The Ukraine)	Linear Induction Accelerator for Charge-Neutralized Ion Beams in Inertial Confinement Fusion
12.05-12.30	V. Chernyshev (Arzamas, Russia)	High-Power Explosive Magnetic Energy Sources for Thermonuclear Applications

12.30-14.00 Lunch

14.00-15.35 Dipoles and Electrostatic. Co-Chairmen: M. Porkolab, J. Kesner (Cambridge, USA) - First Floor, Amador Rooms

14.00-14.25	M. Mauel (New York, USA)	The Dipole Plasma Confinement Concept
14.25-14.50	J. Dawson (Los Angeles, USA)	The Magnetic Dipole as Attractive Fusion Reactor
14.50-15.15	V. Pistunovich (Moscow, Russia)	Galateya Traps as Alternative Basis for Fusion Reactors
15.15-15.40	R. Nebel (Los Alamos, USA)	The Los Alamos Intense Neutron Source and the Penning Fusion Experiment

15.40-16.00 Coffee Break

16.00-18.30 Special Discussion Session: Potential Impact of Technology Advances on Alternative Reactor Concepts. Chairman: J. Dawson (Los Angeles, USA). Panelists (in an alphabetic order)*: V. Chernyshev (Arzamas, Russia), S. Cohen (Princeton, USA), A. Friedman (Livermore, USA), H. G. Logan (Livermore, USA), H. Momota (Nagoya, Japan), S. Nakai (Osaka, Japan)

* Not all confirmations received

Some issues for discussion:

- What fusion-related technology advances can one expect in the next 20 years?
- What technological issues should be resolved to make your concept of the fusion reactor workable?
- What impact would have the following technology advances on your system: High-efficiency direct energy converters; New remote maintenance capabilities (e.g., a frequent replacement of the reactor core); Small-bore very high field coils; Possibility of increasing average heat load on the wall; Neutronically thick liquid walls; High-precision NBI's with a capability of pre-programmed time-variation of the energy; New laser drivers?
- What are your expectations for other major breakthroughs in fusion-related technologies?
- In what areas of technology development could/should the fusion community take the lead?

19.30-21.30 Conference Dinner (No-host bar from 18.30) - Second Floor, Dublin/Pleasanton Rooms

Wednesday, October 22

8.30-10.30 Spherical Tori and Spheromaks. Chairman: R. Blanken (Washington DC, USA) - Second Floor, Dublin/Pleasanton Rooms

8.30-9.15	T. Todd (Culham, United Kingdom)	The Spherical Tokamak Route to Fusion Power Applications (Invited Talk)
9.15-9.40	M. Peng (Princeton, USA)	Scientific Innovations of Interest to NSTX Research
9.40-10.05	B. Hooper (Livermore, USA)	Addressing Spheromak Physics in the Sustained Spheromak Physics Experiment, SSPX
10.05-10.30	M. Yamada (Princeton, USA)	MRX-CT Experiment, Study of Compact Toroids Formed by Induction and Merging

10.30-10.50 Coffee Break

10.50-13.00 Poster Session 2: Closed and Open Field Line Configurations - Second Floor, Concord Room

13.00-14.00 Lunch

14.00-15.35 RFPs and Stellarators. Chairman: H. Momota (Nagoya, Japan) - Second Floor, Dublin/Pleasanton Rooms

14.00-14.45	S. Prager (Madison, USA)	The Reversed Field Pinch: Advances and Prospects (Invited Talk)
14.45-15.10	K. Hayase (Tsukuba, Japan)	Divertor RFP Plasma and Some Considerations at Ignited Plasma Conditions
15.10-15.35	P. Moroz (Madison, USA)	Two Novel Compact Toroidal Concepts with Stellarator Features

15.35-16.00 Coffee Break

16.00-18.30 Special Discussion Session “International Collaboration in Alternative Concepts”. Chairman: T. Dolan (IAEA). Panelists (in an alphabetic order): R. Goldston (Princeton, USA), G. Kessler (Karlsruhe, Germany), E. Kruglyakov (Novosibirsk, Russia), I. Lindemuth (Los Alamos, USA). H. Momota (Nagoya, Japan), L. Qiu (Hefei, China).

Some issues for discussion:

- Coordination of research;
- Sharing equipment;
- Exchanging experimental teams for specialized measurements;
- National and international "user facilities";
- Ways of raising the status of alternative research within the national programs;
- Optimum selection procedures for identifying the most promising concepts;
- Possible role of the IAEA and the ITER process;
- Possible contribution of developing countries;
- Similarities and differences with other international projects.

19.00-21.00 A Satellite Meeting Organized by I. Lindemuth (Los Alamos, USA): “Magnetized Target Fusion”

Thursday, October 23

8.30-10.30 Inertial Confinement Fusion. Chairman: E. Panarella (Hull, Canada) - Second Floor, Dublin/Pleasanton Rooms

8.30-9.15	S. Nakai (Osaka, Japan)	Prospects of Inertial Fusion Energy - Technical and Economical Feasibilities (Invited Talk)
9.15-9.40	M. Tabak (Livermore, USA)	Ignition and High Gain with Ultra-Powerful Lasers
9.40-10.05	R. Bangerter (Berkeley, USA)	Innovative Approaches to Heavy Ion Inertial Fusion - Revolution or Evolution?
10.05-10.30	A. Friedman (Livermore, USA)	Beam Dynamics for HIF

10.30-10.50 Cofee Break

10.50-12.30 Mirrors. Chairman: V. Koidan (Novosibirsk, Russia) - Second Floor, Dublin/Pleasanton Rooms

10.50-11.15	K. Yatsu (Tsukuba, Japan)	Plasma Confinement in Gamma 10 and Tandem Mirror Reactor
11.15-11.40	A. Ivanov (Novosibirsk, Russia)	Experimental Studies of Plasma Confinement and Heating in Gas-Dynamic Trap
11.40-12.05	R. Post (Livermore, USA)	Open-Ended Systems: Some Possible New Directions
12.05-12.30	T. Tamano (Tsukuba, Japan)	D-He^3 Tandem Mirror Approach

13.00-14.00 Lunch

14.00-15.35 Z-pinches and Plasma Foci. Chairman: V. Mokhov (Arzamas, Russia) - Second Floor, Dublin/Pleasanton Rooms

14.00-14.45	V. Smirnov (Troitsk, Russia)	Development of Double Liner Scheme - Dynamic Hohlraum for Pellet Ignition (Invited Talk)
14.45-15.10	M. Sadowski (Swierk, Poland)	Unsolved Problems and Future Prospects of Plasma-Focus Research
15.10-15.35	H. Soliman (Cairo, Egypt)	Dense Plasma Focus Dynamics

15.40-16.00 Coffee Break

16.00-17.00 Summary Session. L.J. Perkins, D. Ryutov (Livermore, USA) - Second Floor, Dublin/Pleasanton Rooms

Poster session 1: Pulsed Fusion Systems, ICF, Technology (Monday, October 20, 16.00-19.00) - Second Floor, Concord Room

1. J. Barnard (Livermore, USA)	Induction Accelerators for Heavy Ion Fusion: Architectures and Options
2. Z. Henis (Yavne, Israel)	Measurements of Axial magnetic Fields Produced by the Interaction of Circularly Polarized Laser Light with Plasma in a Miniature Magnetic Bottle
3.R. Kaita (Princeton, USA)	Development of Plasma Heating and Diagnostic Techniques on CDX-U for the Spherical Torus
4. V. Koidan (Novosibirsk, Russia)	Concept of a Pulsed Multi-Mirror Reactor
5. A. Kukushkin (Moscow, Russia)	Self-Formation and Self-Compression of a Heterogeneous Spheromak-Like Magnetic Configuration in Short-Pulse Discharges and Proof of Concept Experiments on the Magnetic Implosion and Compression of a Heterogeneous Compact toroid
6. I. Lindemuth (Los Alamos, USA)	US/Russian Collaboration: Progress in Magnetized target Fusion
7. C. Marshall (Livermore, USA)	Diode-Pumped Solid-State Laser-Driven Inertial Fusion Energy
8. T. Miyamoto (Tokyo, Japan)	Fusion Approach Based on Sheet Z-Pinches
9. R. Moir (Livermore, USA)	Ultra-High Wall Load Fusion Concepts with Liquid Walls
10.E. Panarella (Hull, Canada)	A Review of Spherical Pinch Research
11. P. Parks (San Diego, USA)	Magneto Inertial Confinement: A High-Gain Approach to Pulsed Power Fusion
12. J. Perkins (Livermore, USA)	Coulomb Barrier Reduction Methods for Fusion
13. M. Schaffer (San Diego, USA)	Slow Liner Fusion
14. R. Siemon (Los Alamos, USA)	Magnetized Target Fusion: Principles and Status
15. P. Sheehey (Los Alamos, USA)	Computational Modeling of Joint US-Russian Experiments Relevant to Compression/Magnetized Target Fusion
16. V. Yakubov (Arzamas, Russia)	On Possibility of Low-Dense Magnetized D-T Plasma Ignition Threshold Achievement in MAGO System
17. Y. Yasaka (Kyoto, Japan)	Basic Experiment on a Traveling Wave Direct Energy Converter for D^3He Fusion Reactor
18. V. Zoita (Bucharest, Romania)	Dense Pinch-Driven Fusion-Fission Hybrid Reactor

Poster session 2: Closed and Open Field Line Configurations (Wednesday, October 22, 10.50-13.00) - Second Floor, Concord Room

1. M. Brown (Swarthmore, USA)	Spheromak Formation, Equilibrium and Merging Experiments on SSX
2. S. Cohen (Princeton, USA)	Elimination of Plasma-Material Interaction Problem in an Advanced Fuel Magnetic Fusion Reactor
3. G. Dimov (Novosibirsk, Russia)	Tandem Mirror Fusion Reactor Concept. The Key Problems
4. A. Frank (Moscow, Russia)	Galathea-Belt Plasma Configurations - Main principles and First Experimental Results
5. A. Ivanov (Novosibirsk, Russia)	Fusion Reactor Concept on the Basis of Gas Dynamic Trap
6. T.R. Jarboe (Seattle, USA)	Steady-State Inductive Helicity Injection for Flux Conserver Spheromaks
7. H. Ji (Princeton, USA)	Physics Issues and Engineering Design of MRX-CT
8. V. Khvesyuk (Moscow, Russia)	Alfven Instabilities in FRC
9. V. Khvesyuk (Moscow, Russia)	Analysis of D-^{3}He-^{6}Li Fuel Cycle
10. G. Miley (Urbana, USA)	IEC Concept for Fusion Applications
11.S. Okada (S. Okada, Japan)	Heating of FRC by a Magnetic Pulse and a Proposal for Axial Magnetic Compression
12. V. Pistunovich (Moscow, Russia)	Mixina Concept for the Experimental Galateya Reactor
13. M. Schaffer (San Diego, USA)	Helical-D Pinch
14. S. Shiina (Tokyo, Japan)	Resistive Kink-Mode-Stable, Higher Beta Reversed Field Pinch Configuration with RF Current Drive
15. L. Steinhauer (Seattle, USA)	High-Beta Relaxed Plasmas for Fusion Applications
16. Y. Tomita (Nagoya, Japan)	Collisionless Pitch Angle Scattering and Related Loss Process of Plasma Particles in a Field Reversed Configuration